Paradise

Paradise Overview

Volunteer monitoring began at Paradise Lake in 1996 and has continued through 2004. The data indicate this lake, whose watershed extends into Snohomish County, is high in primary productivity (eutrophic) with fairly good water quality.

Paradise Lake has no public access boat launch, but residents should watch the nearshore environment for early infestations of Eurasian milfoil, Brazilian elodea, and other noxious weeds.

Physical Parameters

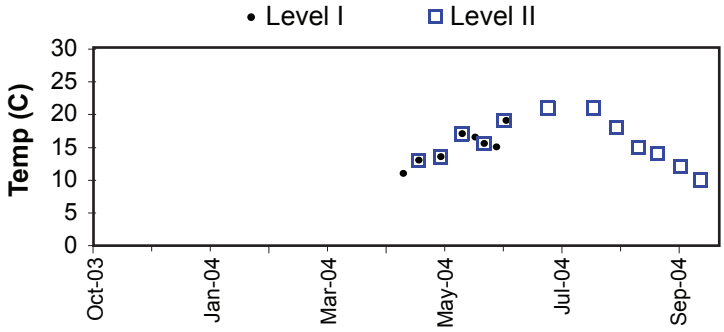
Secchi transparency ranged from 2.0 to 4.0 m from late April through October, averaging 3.0 m, which placed it in the mid range of the monitored small lakes in 2004. Water temperatures ranged from 10.0 to 21.0 degrees Celsius, among the coolest of the group for maximum temperature recorded.

Water levels were recorded April through June.

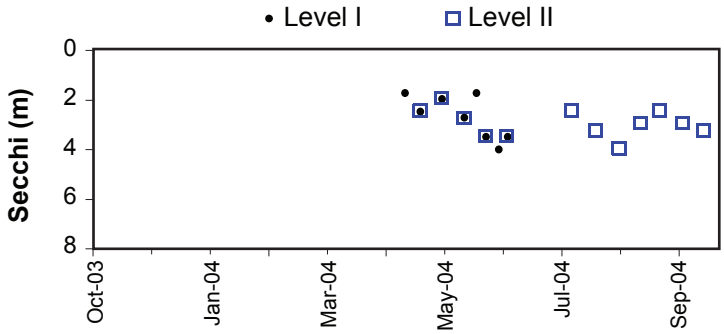
Nutrient Analysis and TSI Ratings

The patterns followed by total nitrogen and phosphorus were generally similar through the season, with phosphorus varying a little more than nitrogen. The N:P ratio ranged from 14 to 30, averaging 20 which suggested that conditions could be good for nuisance bluegreen growth at times during the season.

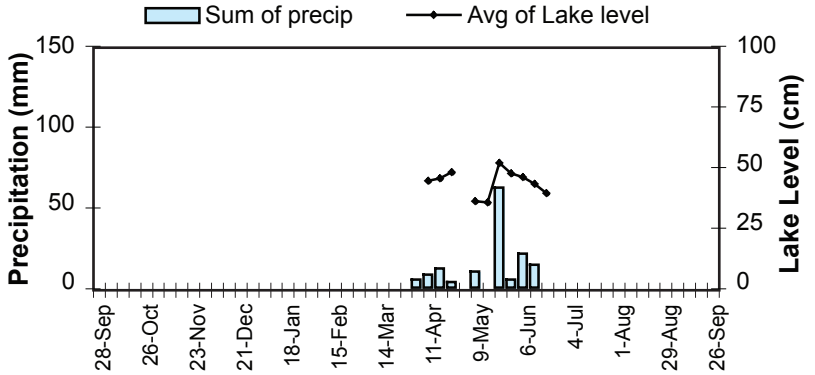
Lake Temperature



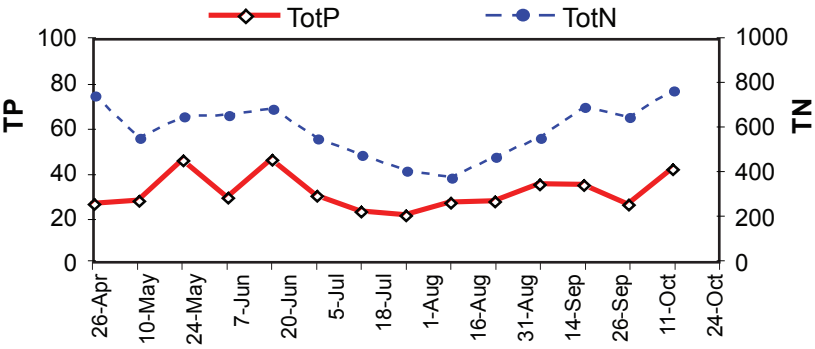
Secchi Depth



Lake Level and Precipitation



Nutrient Analysis



Profile data indicate that thermal stratification was present early in the season and persisted through the summer. High concentrations of phosphorus in the deep water increased over time, signifying sediment release of phosphorus. Chlorophyll data indicated that algae were more abundant in the middle of the water column than in shallow water.

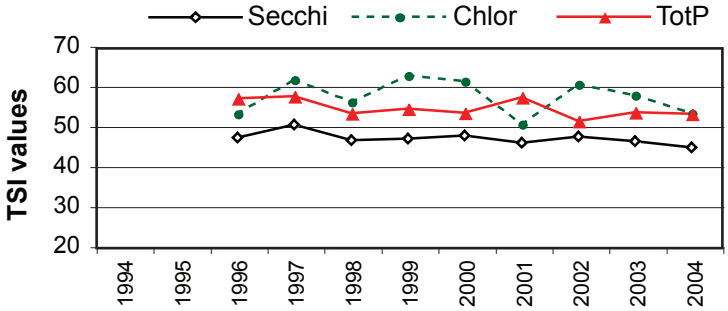
In 2004 the TSI values for chlorophyll and TP were close together and indicated eutrophy, while the Secchi was in the mesotrophic range, a pattern similar to past years.

Chlorophyll Concentrations and Algae

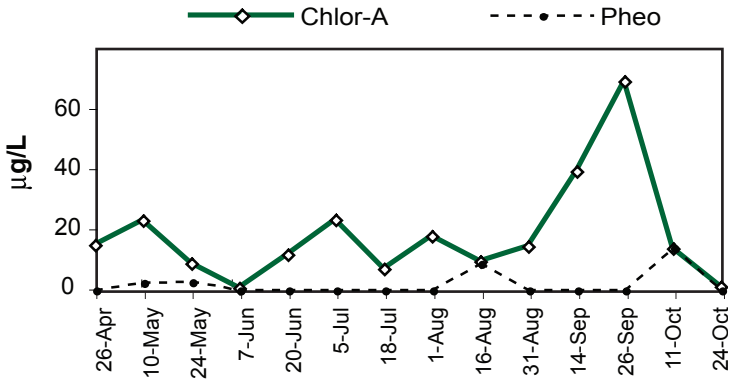
Chlorophyll concentrations reached a major peak in late September, with smaller peaks in May, July and August. The September peak was dominated by the haptophyte *Chrysochromulina*, while the other peaks were characterized by an unidentified chrysophyte and the dinoflagellate *Ceratium hirundinella*. Very few bluegreens were found in the samples.

Date	Secchi	depth-m	degC	Chlor-A	TP µg/L	TN µg/L
5/24/04	2.8	1	17.0	8.01	44.7	650
		4	9.0	12.10	25.2	693
		7.5	5.0		493.0	1500
8/31/04	4.0	1	18.0	13.30	26.3	467
		4	14.0	31.90	40.4	461
		7.5	6.5		611.0	2560

TSI Ratings



Chlorophyll a Concentrations (ug/L)



Common Algae

	Group
Ceratium hirundinella	Dinophyta
Chrysochromulina sp	Haptophyta
unidentified single cells	Chrysophyta

Paradise

2004 Level I Data

Daily Data Summary					Weekly Data Summary						
Week of	Sum of precip. (mm)	# of days	Avg of lake level (cm)	# of days	Sample date	Sample time	Secchi (m)	Temp (°C)	Algae* (Shore)	Algae* (at site)	Goose Count*
28-Sep-03											
5-Oct-03											
12-Oct-03											
19-Oct-03											
26-Oct-03											
2-Nov-03											
9-Nov-03											
16-Nov-03											
23-Nov-03											
30-Nov-03											
7-Dec-03											
14-Dec-03											
21-Dec-03											
28-Dec-03											
4-Jan-04											
11-Jan-04											
18-Jan-04											
25-Jan-04											
1-Feb-04											
8-Feb-04											
15-Feb-04											
22-Feb-04											
29-Feb-04											
7-Mar-04											
14-Mar-04											
21-Mar-04											
28-Mar-04											
4-Apr-04	5.0										
11-Apr-04	8.0	3	44.0	1	16-Apr-04	7:30	1.8	11.0		NA	
18-Apr-04	12.0	3	45.0	1							
25-Apr-04	3.5	7	47.5	2	26-Apr-04	7:45	2.5	13.0		NA	2
2-May-04	0.0	0		0							
9-May-04	10.0	3	35.5	2	10-May-04	8:15	2.0	13.5		NA	4
16-May-04	0.0	0	35.0	1							
23-May-04	62.0	2	51.3	3	24-May-04	17:15	2.8	17.0	NA	P1	2
30-May-04	5.0	1	47.0	1	1-Jun-04	15:15	1.8	6.5	NA	P2	0
6-Jun-04	21.0	5	45.5	1	7-Jun-04	9:00	3.5	15.5	NA	P3	0
13-Jun-04	14.0	5	42.8	4	15-Jun-04	8:15	4.0	15.0	NA	P1	0
20-Jun-04	0.0	7	39.0	1	21-Jun-04	9:00	3.5	19.0	P1	P1	0
27-Jun-04											
4-Jul-04											
11-Jul-04											
18-Jul-04											
25-Jul-04											
1-Aug-04											
8-Aug-04											
15-Aug-04											
22-Aug-04											
29-Aug-04											
5-Sep-04											
12-Sep-04											
19-Sep-04											
26-Sep-04											
Min	0.0		35.0			**Min**	1.8	6.5			
Max	62.0		51.3			**Max**	4.0	19.0			
Total	140.5										

* See introduction discussion of algae assessment and goose count methods.

2004 Level II Data

Date (2004)	Temp (°C)	Secchi (m)	Chl-*a* (µg/l)	TP (µg/l)	TN (µg/l)	Algae Obsv.	N:P	Calculated TSI		
								Secc	chl-a	TP
26-Apr	13.0	2.5	13.80	25.1	742	1	30	46.8	56.3	50.6
10-May	13.5	2.0	21.50	26.6	553	1	21	50.0	60.7	51.5
24-May	17.0	2.8	8.01	44.7	650	1	15	45.1	51.0	59.0
7-Jun	15.5	3.5	<detect	28.1	655	3	23	41.9	23.8	52.3
20-Jun	19.0	3.5	10.90	45.1	684	1	15	41.9	54.0	59.1
5-Jul	18.0	2.5	21.60	28.8	550	3	19	46.8	60.7	52.6
18-Jul	21.0	NR	6.41	21.8	477		22		48.8	48.6
1-Aug	NR	2.5	16.50	20.1	405	3	20	46.8	58.1	47.4
16-Aug	21.0	3.3	8.81	25.9	373	1	14	42.8	51.9	51.1
31-Aug	18.0	4.0	13.30	26.3	467	3	18	40.0	56.0	51.3
14-Sep	15.0	3.0	36.70	33.9	553	1	16	44.1	65.9	55.0
26-Sep	14.0	2.5	64.70	33.8	692	3	20	46.8	71.5	54.9
11-Oct	12.0	3.0	12.80	24.8	645	1	26	44.1	55.6	50.5
24-Oct	10.0	3.3	0.80	40.9	764	2	19	42.8	28.4	57.7

	Temp (°C)	Secchi (m)	Chl-*a* (µg/l)	TP (µg/l)	TN (µg/l)	Algae	N:P	Calculated TSI		
								Secc	chl-a	TP
Mean	15.9	3.0	18.1	30.4	586.4	1.8	20	44.6	53.0	53.0
Median	15.5	3.0	13.3	27.4	599.0	1	20	44.1	55.8	51.9
Min	10.0	2.0	0.8	20.1	373.0	1	14	40.0	23.8	47.4
Max	21.0	4.0	64.7	45.1	764.0	3	30	50.0	71.5	59.1
Count	13	13	13	14	14	13	14	13	14	14

TSI Average = 50.2